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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/614,698	07/12/2000	Won-ick Ahn	Q59536	2185

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EXAMINER

MUNOZ, GUILLERMO

ART UNIT	PAPER NUMBER
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2634

DATE MAILED: 07/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/614,698

Applicant(s)

AHN, WON-ICK

Examiner

Guillermo Munoz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 5 and 6 is/are rejected.
- 7) ☒ Claim(s) 3, 4, 7 and 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 July 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Response to Arguments

Applicant's arguments filed on May 11, 2004, regarding claim 1 and all claims dependent thereon, have been fully considered but they are not persuasive.

Applicant's argument—Regarding claim 1, Applicant argues Examiner fails to explain how Shiue et al. provides a phase lock signal to the equalizer. Additionally, Applicant argues neither Murakami et al. nor Shiue et al. teaches or suggests changing the operation of an equalizing unit after a predetermined time has lapsed.

Examiner's response—Regarding providing a phase lock signal to the equalizer, Shiue et al. teach "control generator 26 evaluates the differences... The Slice Error signal controls the switching operation of switch 42 between blind and decision-directed equalizing modes. Specifically, the system switches to the decision-directed mode when switch 42 senses that the number of symbol points in a predetermined decision region around a programmed (expected) symbol point has reached a predetermined value. An increasing number of symbol points in the decision region indicates increasing convergence... the measured number of samples within the decision regions exceeds a predetermined threshold... a comparator within switch 42 senses this value and provides an output control signal causing MUX 44 to switch from the blind to the decision-directed mode" (Col. 5, lines 59 — Col. 6, line 14).

Instant Application teaches the phase lock signal being provided to switch 208 of equalizer 20 in figure 3, wherein switch 208 serves the purpose of "equalization algorithm converter" (Page 7, line 19), i.e. the switch 208 switches to the decision-directed mode when a phase lock signal is received as a control signal input at switch 208.

Shiue et al. does not explicitly state providing a phase lock signal, however, the Shiue et al.'s output control signal is generated based on the number of measured differences between the locations of corresponding input symbols and output symbols of slicer 40 being within a predetermined decision region. Shiue et al. teach the difference between the input symbols and output symbols of slicer 40 is representative of a phase error, note Col. 4, lines 10-12, therefore, the region around a programmed (expected) symbol point is interpreted as a region of phase around an expected symbol point. The predetermined value is a required number of symbol points to be within this region for the purpose of providing a confidence count and insuring stable convergence.

Shiue et al. teaches upon sensing that a predetermined number of symbols is within the region a comparator generates an output control signal, i.e. a phase lock signal, causing MUX 44 to switch from the blind to the decision-directed mode.

Although, Shiue et al. does not explicitly show switch 44 as an element within the equalizer function block the location of the switch 208 presents no new or unexpected results, so long as the comparator can sense a threshold value and cause equalization algorithm converter to switch from a blind to a decision-directed mode. Therefore, to have the equalization algorithm

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converter switch displayed within an equalizer function block would have been routine experimentation and optimization in the absence of criticality.

Regarding changing the operation of an equalizing unit after a predetermined time has lapsed, Shiue et al. teach the "the static condition of FFF 20 is maintained until after a predetermined number of symbols have been sampled" (Col. 5, lines 33-34); "FFF 20 can be enabled for adaptive equalization by employing a counter, accumulator and comparator...the comparator senses that a predetermined number of symbols have been sampled (signifying the end of the initial phase of the blind equalization interval).

Shiue et al.'s symbol counter serves the function of timing the first phase of the blind equalization interval for the period of time required to receive the predetermined number of symbols. Shiue et al.'s comparator serves the purpose of changing the operation of the equalizer after a predetermined period of time, i.e. the time required for counter to reach a predetermined threshold.

Drawings

Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al. (US Patent Number 6,678,317 B1) in view of Shiue et al. (US Patent Number 5,712,873).

Regarding claim 1, Murakami et al. disclose an Adaptive Equalizer Device which teaches all the claimed subject matter in claim 1 as follows: the equalizing unit is anticipated by element 4a of figure 1; self-recovering equalization algorithm is anticipated by element 17 in figure 4; decision directed equalization algorithm is anticipated by element 18 in figure 4; decision unit is anticipated by element 10 in figure 17; carrier recovering and phase lock detecting unit is anticipated by elements 5 and 19 in figure 8; and coefficient updating unit is anticipated by element 8 in figure 3, except their adaptive equalizer is not shown to be a adaptive equalizer having a feed forward filter and a decision feedback filter. Furthermore, Murakami et al. do not particularly call for a phase lock signal provided to the adaptive equalize after a predetermined time.

Shiue et al. teach the use of an adaptive equalizer having a feed forward filter and decision feedback filter. Shiue et al.'s adaptive equalizer requires a re-rotator input into the decision feedback equalizer for the purpose of de-rotating the decision unit output signal so that the decision feedback filter output may be added to the feed forward filter output signal. Shiue et al. teach a comparator within switch 42 that senses a threshold value and provides an output control signal causing MUX 44 to switch from the blind to the decision-directed mode, note Col. 6, line 14, for this reason the control signal is equivalent to the phase lock signal. Shiue et al.

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teach a symbol counter that serves the function of timing by counting to a predetermined number of symbols before ending a first blind equalization phase.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify Murakami et al.'s adaptive equalizer with Shiue et al.'s teaching of a DFF/FEE equalizer since Shiue et al. suggest in column 3, lines 8-12 that disclosed adaptive FFF/DFF equalizer system achieves faster convergence in the presence of large ghost.

Regarding claim 2, as applied to claim 1 above, Shiue et al. further teach the claimed subject matter as follow: feed forward equalizer is anticipated by element 20 of figure 1; feedback equalizer is anticipated by element 30 of figure 1; adder is anticipated by element 24 of figure 1; and equalization algorithm converter is anticipated by element 26 of figure 1.

Regarding claim 5, as applied to claim 1 above; Shiue et al. further teach the claimed subject matter in figure 1, element 50 and 52.

Regarding claim 6, as applied to claim 1 above; Shiue et al. further teach the claimed subject matter in figure 1, elements 26, 20, and 30.

Claim Objections

Claim 3 is objected to because the claim includes variables not defined in the claim language. The term "below" is critical or essential to the practice of the invention, but not defined in the claim.

Claims 4, 7, and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Allowable Subject Matter

Claim 9 is allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Claim 9 is considered allowable because the present invention comprises a method of determining whether the output from a phase lock detector is a frequency offset release signal or a frequency offset capture signal. The closest prior art, Shiue et al., (US Patent Number 5,712,873) shows a similar circuit including an equalizer adapted to operate under a self-recovering equalization algorithm or under a decision directed algorithm. However, Shiue et al. fails to teach a method for determining whether the output from a phase lock detector is a frequency offset release signal or a frequency offset capture signal. This distinct feature has been included in independent claim 9 rendering it allowable.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Guillermo Munoz whose telephone number is 703-305-4224.

The examiner can normally be reached on Monday-Friday 8:30a.m-4:30p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 703-308-7728. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



GM
July 15, 2004



JEAN B. CORRIELUS
PRIMARY EXAMINER

7/23/04